Spinal Brucellosis with Paraspinal Abscess Formation Treated with CT Guided Percutaneous Abscess Drainage

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Summary

Although brucellosis may be present in various systems, osteoarticular brucellosis is a serious complication of human brucellosis. We present two cases of Brucellar spondylitis (BS) having paraspinal abscess with epidural extension. The first case of non-complicated paraspinal abscess was treated effectively with percutaneous abscess drainage and antibrucellar chemotherapy. However, the second case with disseminated BS and multiseptated large abscess did not respond to needle drainage with medical treatment. Because of the persistence and re-growth of the abscess, he was treated with percutaneous catheter drainage using the Seldinger technique. They showed adequate radiological and clinical response to drainage and antibrucellar chemotherapy.

Introduction

Human brucellosis is a zoonotic disease produced by Brucella microorganism. The disease is transmitted by ingestion of infectious products or direct contact with infected animals, and is followed by haematogenous dissemination, residence in the reticuloendothelial system, and subsequent involvement of any organ system. Although various systems may be affected by the disease in humans, osteoarticular brucellosis is one of the most important complications. We present two case of spinal brucellosis having neurological symptoms with paraspinal abscess formation successfully treated with CT guided percutaneous drainage.

Case 1: A 16-year-old boy presented with back pain, weight loss, and lack of appetite. Physical examination revealed pallor and back pain with flexion and tenderness with palpation on lumbar area, and one BCG scar on the right shoulder. Hemoglobin of 9.3 g/dl, erythrocyte sedimentation rate of 90 mm/hour were yielded in laboratory evaluation. Serum LDH, uric acid and electrolyte levels including sodium, potassium and calcium were in normal range. HLA B27 antigen, PPD test and standard tube agglutination test for Brucellosis were negative while IgM and IgG antibodies were positive. Bone marrow aspiration smear was unremarkable for malign infiltration. Blood and bone marrow culture revealed no microorganism. Plain radiography showed end plate irregularity and heterogeneity of the vertebral bodies of L-2 and L-3 (figure 1). On CT scan, erosions and sclerosis of the vertebral corpus of L-2 and L-3 were detected (figure 2). There was also paravertebral abscess formation with epidural extension. MR imaging on T1-weighted and T2-weighted images clearly revealed the vertebral involvement of L-2 and L3 and epidural exten-

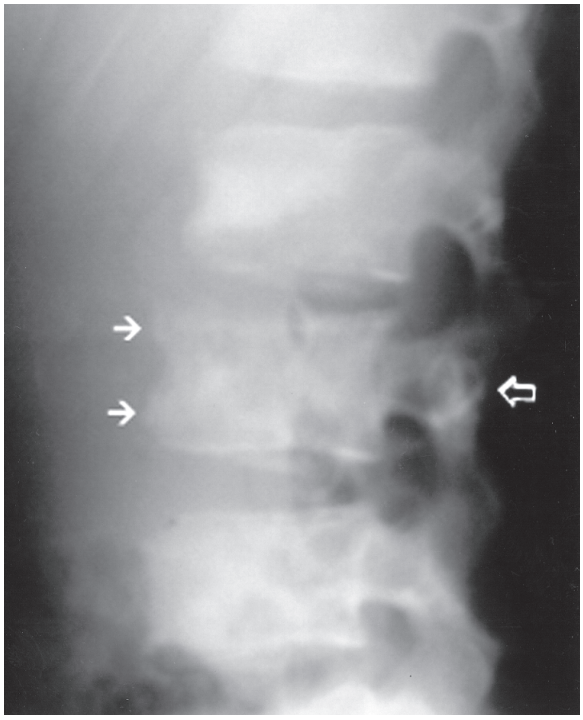

Figure 1 A) lateral radiograph shows anterior osteophytes (white arrows) and irregularity of the L-2 and L-3 endplates (open arrow) with heterogeneity of the vertebral bodies.

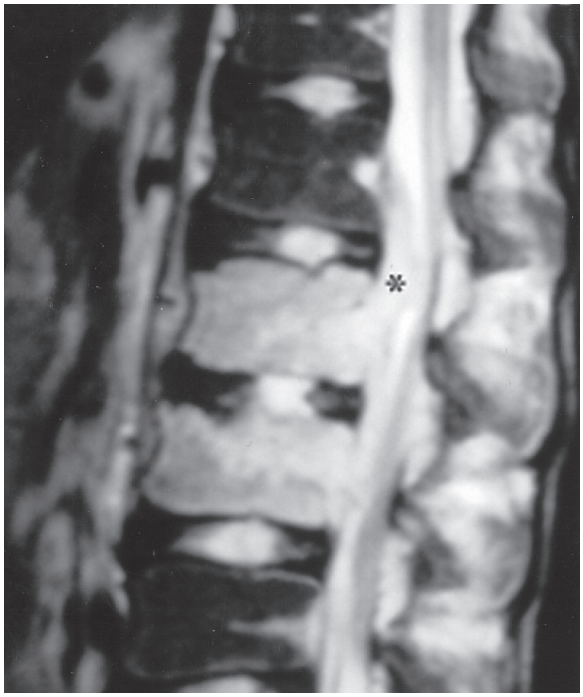

Figure 3 Midsagittal T2-weighted MR image (TR/TE, 3800/103) reveals prominent hyperintensity on L-2 and L-3 with irregularity of the endplates. Note the paravertebral abscess extending to epidural space and displacing the cord (star).

sion of the abscess (figure 3). CT-guided percutaneous drainage of the abscess was performed for detection of the pathology and to relieve of the back pain (figure 4). Approximately 25 cc abscess material was drained. The patient's back pain was markedly decreased just after drainage. No microorganism was cultured from abscess material. The patient was administered ten days of gentamycin, and six weeks of doxycycline and rifampicin. Six weeks later, IgM antibodies for Brucella were negative in enzyme-linked immunosorbent assay (ELISA). He had no complaint and he had a 10 kg weight gain. On IV contrast enhanced MR imaging, there was no abscess material on the paravertebral area except from minimal contrast enhancement of granulation tissue (figure 5).

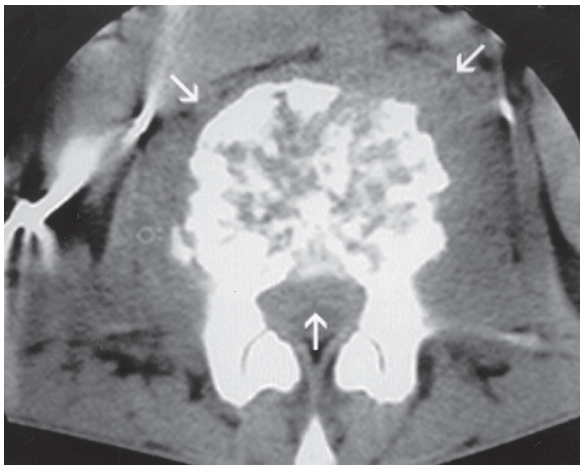

Figure 2 An axial CT scan at the corpus of L-2 shows diffuse destruction and reactive sclerosis areas. There is also paraspinal abscess formation with semi-solid density (21 HU), extending to epidural space (arrows).

Case 2: A 36-year-old male complained of fatigue, fever, pain of the left leg, bilateral hips, and lumbosacral site, weight loss and lack of appetite for three months. There was also difficulty on walking for a month. CRP of 4.26 mg/dl, WBC of 2300/mm^3, and erythrocyte sedimentation rate of 140 mm/hour were found in laboratory evaluation. IgM and IgG antibodies and Brucella agglutination test (1/640) were positive. Lumbar CT scan showed destruction of vertebral corpuses of L-3, L4, and L-5 with contrast enhancing paravertebral abscess and the left iliopsoas abscess having internal septae (figure 6). MR imaging revealed disseminated

spondylitis with involvement of the vertebral bodies of L2, L-3, L-4, and L-5 with discitis (figure 7A,B). The patient was given doxycycline of 200 mg/day, and rifampicin of 600mm/day, and TMP-SMZ of 960 mg/day. Percutaneous drainage of the paravertebral abscess was obtained with a 18-gauge needle. 115 cc abscess material was drained, and the patient's complaints were partially removed after drainage immediately, the left leg pain especially. Although antibrucellar treatment was administrated daily, the patient's complaints did not recover with time and the amount of abscess was not decreased prominently on follow-up MR imaging. Hence, catheter drainage was planned. By using Seldinger's technique, a multi–side-hole catheter of 10 F was inserted into the abscess cavity, and an abscess of 130 cc was drained immediately (figure 8). With continued medical treatment, 20-40 cc/day abscess was drained throughout the catheter (1060cc totally). On MR imaging taken at 30 days of the drainage, there was little fluid in the left psoas muscle and paravertebral area with granulation tissue on the paravertebral area (figure 9). With prominent clinical healing, the patient has gained 13 kg of weight. Brucella agglutination test (1/320) has decreased at this time. This patient is still being followed up.

Discussion

Brucellosis is endemic in many parts of the world, as in the Turkey. It is an infection of the reticuloendothelial system produced by Brucella melitensis, Brucella abortus, and Brucella suis. The disease is frequently detected in males older than 50 years of age [1]. After ingestion of infected dairy products or contact with infected animals, it spreads by the blood and various symptoms occur in many systems. The most common complications are bone and joint involvement. Osteoarticular brucellosis may occur as arthritis, spondylitis, osteomyelitis, tenosynovitis, and bursitis. While the sacroiliac joint is the most frequently affected joint in osteoarticular brucellosis, the spine is the predominant site of bone brucellosis [2,3]. Although the whole vertebrae may be involved in spinal brucellosis, the lumbar spine is the most commonly affected spinal site. Brucella infection gains access to the vertebral body via the haematogenous route, and later it induces a granulomatous type of osteomyelitis. Brucellar spondylitis (BS) may

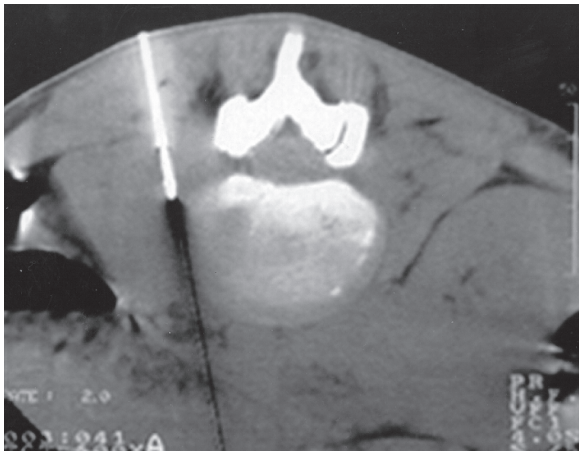

Figure 4 An axial CT scan on prone position shows drainage of the paraspinal abscess by 18-gauge chiba needle.

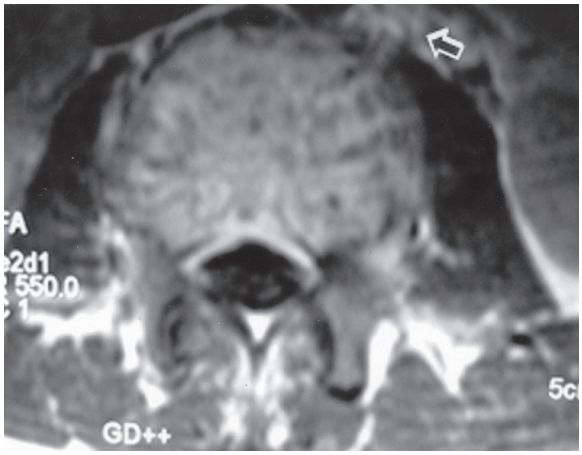

Figure 5 Six-weeks after drainage with antibrucellar chemotherapy, there is no paravertebral abscess except for contrast enhancement of granulation tissue (open arrow) and heterogeneous intensity of the vertebral body, due to the bone sclerosis.

Figure 6 A contrast enhanced CT scan of the lower spine shows vertebral destruction and contrast enhancing paravertebral abscess with extension in the epidural space and psoas muscle.

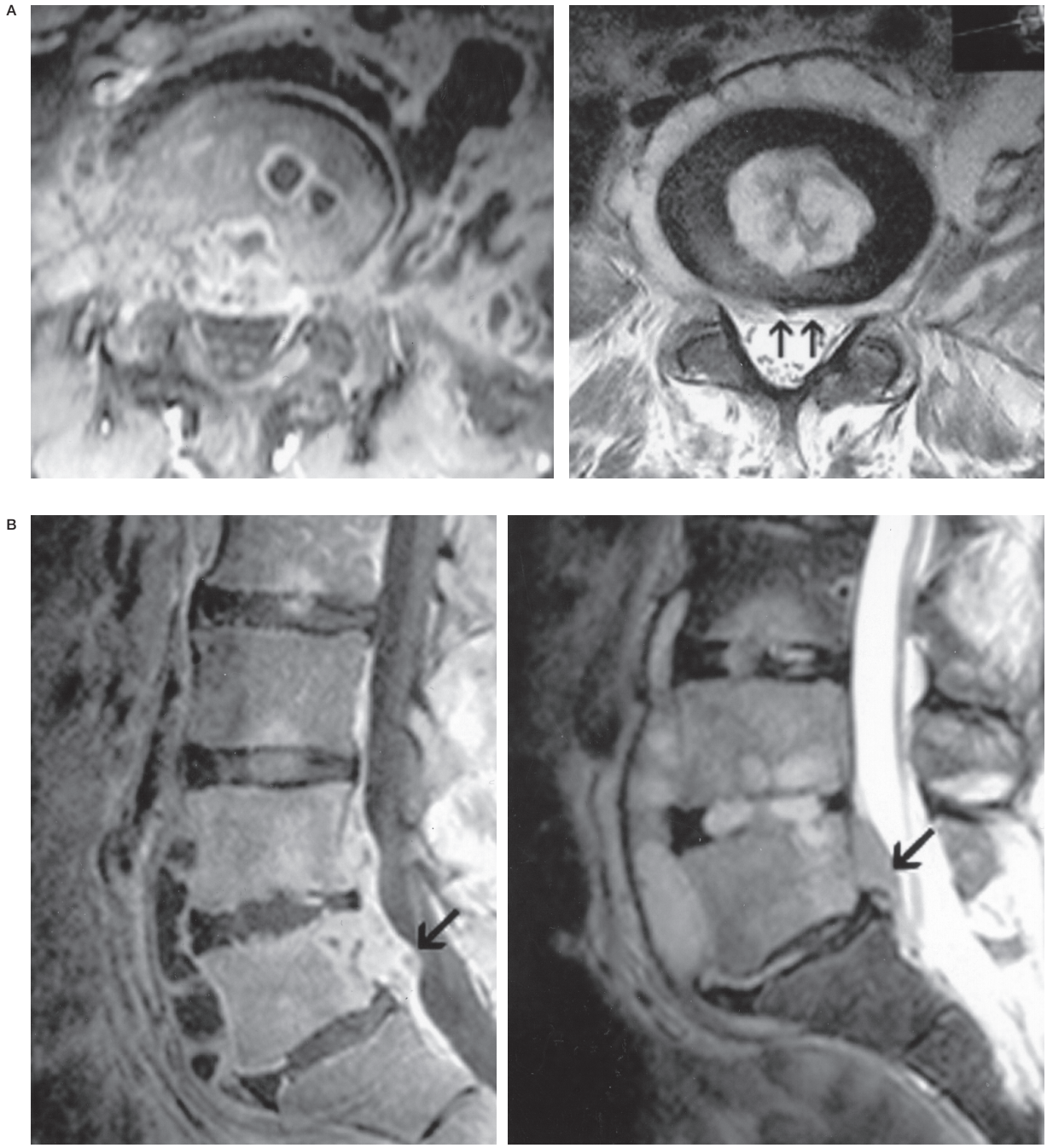

Figure 7 A,B) Intravenous contrast enhanced T1-weighted and T2-weighted MR images reveal spondylitis of the vertebrae of the L2, L-3, L-4, and L-5 with discitis. These images more clearly show multiloculated paravertebral abscess, epidural extension (arrows), and contrast enhancement of the abscess.

be found in focal or diffuse form. In focal BS, the infective process is especially localized to the anterior aspect of an endplate at the discovertebral junction. In the diffuse form, the infection initially involves an entire vertebral body and ultimately extends to neighbouring vertebrae [2,3]. Although neurological complications are infrequent in BS, they may occur in the diffuse form, due mainly to extension of the inflammatory process into the epidural space.

However, the disk is usually spared. Because the inflammatory process is characterized by a combination of destruction and repair, bone erosions, sclerosis, and anterior osteophytes (parrot's beak) are found in BS [3,4].

Early diagnosis and prompt treatment with antibrucellar chemotherapy are important to avoid many of the complications of the disease. The clinical features of the disease are extremely variable and difficult to diagnose. The most common symptoms are fever, malaise, anorexia, back and joint pain, excessive sweating, anemia, and clotting disorders.

Various investigations may be used in diagnosis. Although diagnosis is essentially made by serum tests and bacterial culture, gram stains of tissues are generally negative, and cultures are positive in less than 25% of cases [5]. Identification of antibodies against Brucella in the serum is the most sensitive and specific way to detect the organism, and ELISA is considered superior to agglutination assays.

Although bone scintigraphy is more sensitive than radiography in the early detection of BS, and performance of three-phase bone scanning can help in assessment of disease activity, it is less helpful in differentiating BS from other infections [2,4]. 69% of patients with brucellosis show diffuse abnormal uptake with the intact

Figure 8 3D Multislice CT image shows the inserted catheter at the paravertebral site and destructions of the lumbar vertebral bodies.

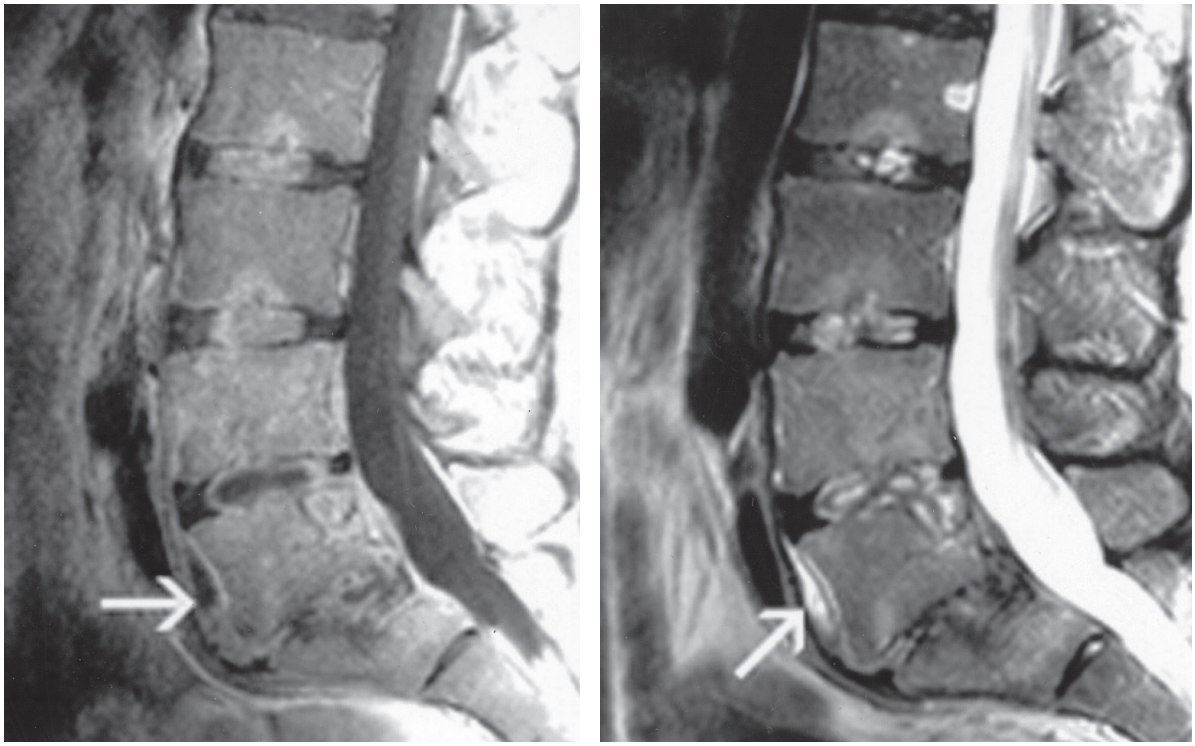

Figure 9 Intravenous contrast enhanced T1-weighted and T2-weighted MR images show a small amount of the paravertebral fluid (arrows) with prominently resolved intensity of spondylitis according to the preoperative MR imaging. There is also a decrease size of the epidural abscess.

vertebral architecture [3]. Plain radiography is helpful to show characteristic features of the disease such as site of spinal involvement, integrity of vertebral architecture, the presence or absence associated paraspinal soft-tissue mass, and disk gas [2,3].

CT scan is superior to plain radiography in demonstration of vertebral destruction with sclerosis and paraspinal abscess formation. CT scan also allows CT guided interventional procedures such as biopsy and drainage, as in the cases presented.

MR imaging is more sensitive than other imaging modalities for detecting the presence and extent of musculoskeletal infections [2]. MR imaging more clearly reveals the location and extent of osteomyelitis, and the presence of granulation tissue and the paraspinal abscess with their epidural and paravertebral extension. T2-weighted images are especially sensitive for infectious spondylitis, and the involved vertebrae show hyperintensity despite their intact architecture. On contrast enhanced images, the inflammatory process and abscess will show typical contrast enhancement.

In differential diagnosis, spinal infections associated with granulomatous reaction such as tuberculosis or fungal infection should be entertained [6]. Caution must be exercised with regard to the diagnosis of rare lesions, such as in the patient who had BS and psoas abscess. Although psoas abscess formation is more common in tuberculous spondylitis (TS), the extent of the tuberculosis abscess and degree of encroachment on the spinal canal and cord are more severe than that seen in BS. While BS most commonly affects the lower lumbar spine, TS is most common in the midthoracic spine. The other radiographic features distinguishing BS from TS are intact vertebral architecture despite evidence of diffuse vertebral osteomyelitis, focal sclerosis and in association with areas of localized bone erosion, and no gibbus deformity. Both infections may also coexist in the same spine [2,6].

Because BS responds adequately to chemotherapy, surgical decompression is rarely needed. However, surgery is frequently necessary on a large abscess having internal septations and multiple vertebral involvements. Percutaneous drainage with medical treatment, which is less invasive than open surgery, may be performed in the cases of paravertebral abscess. With low mortality and morbidity, percutaneous drainage entails shorter hospital stays and lower cost than surgery. The catheter may be inserted into the abscess cavity using the Seldinger technique or a trocar technique according to the size, location and septations of the abscess. We preferred to use the Seldinger technique because the abscess cavity was complex, multiloculated, and large, and a multi-side-hole catheter was necessary for effective drainage. The duration of drainage may be as long as two months [7]. Antibrucellar chemotherapeutics, such as gentamycin, doxycycline, streptomycin, TMP-SMZ, and rifampicin are used in medical treatment which should be continued for at least six weeks at an adequate dose.

Conclusions

CT-guided percutaneous drainage may be performed to achieve urgent relief of pain and treatment in the BS cases of paraspinal-iliopsoas abscesses. Our cases showed that if the paravertebral abscess is small, percutaneous drainage with medical treatment may be effective. However, if the abscess is large and diffuse, percutaneous drainage by drainage catheters is necessary in the septated abscess especially. MR imaging and CT scan are most suitable for evaluation and follow-up of patients with infectious spondylitis.

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